

**RAILWAY CAR COUPLER KNUCKLE  
HAVING IMPROVED BEARING SURFACE**

FIELD OF THE INVENTION

The present invention relates, in general, to railway freight car couplers which are disposed on each end of a railway freight car and, more particularly, this invention relates to a railway freight car coupler knuckle having an improved bearing surface area for mating engagement with an adjacently disposed coupler knuckle disposed at one end of an adjacent railway freight car. Additionally, the present invention relates to a railway freight car coupler knuckle having an improved bearing surface area which can be retrofitted onto an existing railway freight car coupler.

BACKGROUND OF THE INVENTION

As is generally well known in the railway art, a coupler is disposed at each end of a railway car to enable joining one end of such railway car to an adjacently disposed end of another railway car. The engageable portions of these couplers is known in the railway art as a knuckle. For example, railway freight car coupler knuckles are taught in the following U.S. Patents 4,024,958; 4,206,849; 4,605,133; and 5,582,307. The teachings in each of these patents are incorporated herein by reference thereto.

Over the years it has been discovered, in the railroad industry, that relatively small point to point contact surfaces of the engaged portions of these knuckles can cause premature failure due to stress points being established within the  
5 knuckle.

These coupler knuckles are generally manufactured from a cast steel and during the casting process itself the interrelationship of the mold and the core disposed within the mold are critical to producing a satisfactory railway freight car coupler knuckle.  
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For example, if, during such casting process, the mold should happen to slip along the parting line for any reason then a detrimental point to point surface contact can be established in the finished knuckle. In this case, to provide a satisfactory surface it is necessary to either grind or machine such surface  
15 of the knuckle. As would generally be expected by persons skilled in the art, such grinding and/or machining of such surface can add substantially to the cost of producing a satisfactory coupler.

20 Furthermore, it has been found that grinding the bearing surface can also establish point to point contact in a number of places and as discussed above this will add stress to the coupler knuckle.

In any case, however, prior to the conception and development of the present invention it has generally been quite difficult to provide a substantially flat surface area on these coupler knuckles. One reason for this is the draft angles which  
5 are required in order to produce a satisfactory casting.

#### BRIEF SUMMARY OF THE INVENTION

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The present invention provides, a coupler knuckle casting having an enhanced bearing surface area. Such coupler knuckle casting is utilized in a railway freight car coupler. The coupler knuckle casting having such enhanced bearing surface area including a tail section and a hub section. The hub section has a pivot pinhole formed therein. Such pivot pinhole has generally straight cylindrical sidewalls. A front face section is connected to such hub section. The front face section includes a nose section. The front face section further includes a pulling face portion formed inwardly from such nose section. At least a portion of such front face portion and such nose section includes an enhanced bearing surface area which includes a substantially flat portion disposed substantially in  
20 a vertical direction and which is substantially arcuate in a horizontal direction. The substantially flat portion extending for a predetermined distance in the vertical direction and for a predetermined length along the horizontal direction. There is a transition section joining the tail section to the hub

section. The transition section includes a top metal section and a bottom metal section extending toward each other.

According to a second embodiment, the present invention provides in combination with a railway freight car coupler, the improved coupler knuckle casting having an enhanced bearing surface area.

In a third and final embodiment, the present invention provides an existing railway freight car coupler retrofitted with the improved coupler knuckle casting having the enhanced bearing surface area.

#### OBJECTS OF THE INVENTION

It is, therefore, one of the primary objects of present invention to provide a knuckle for a railway freight car coupler having an improved bearing surface which does not require any significant grinding and/or machining of the bearing surface when compared to prior art type coupler knuckles.

Another object of the present invention is to provide a knuckle for a railway freight car coupler having an improved bearing surface which will exhibit an extended life cycle when compared to prior art type coupler knuckles.

Still another object of the present invention is to provide a knuckle for a railway freight car coupler having an improved bearing surface which can be retrofitted onto existing freight car couplers.

Yet another object of the present invention is to provide a knuckle for a railway freight car coupler having an improved bearing surface which will substantially minimize any point to point contact areas thereby minimizing stresses set up in the coupler knuckle which could cause premature failure of such coupler knuckle.

A further object of the present invention is to provide a knuckle for a railway freight car coupler having an improved bearing surface which will substantially minimize coupler knuckle maintenance when compared to prior art type coupler knuckles.

It is an additional object of the present invention to provide a knuckle for a railway freight car coupler having an improved bearing surface which can be formed as a conventional steel casting.

Still yet another object of the present invention is to provide a knuckle for a railway freight car coupler having an improved bearing surface which for the railway freight car owner to use.

In addition to the various objects and advantages of the present invention which have been described in some detail above, it should be noted that various other objects and advantages of the instant invention will become more readily apparent to those persons who are skilled in the relevant art

from the following more detailed description of the invention, particularly, when such detailed description is taken in conjunction with the attached drawing figures and with the appended claims.

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#### BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a top elevation view of a railway car coupler knuckle which has been modified in accordance with present invention; and

Figure 2 is a side view of the railway car coupler knuckle illustrated in Figure 1.

#### BRIEF DESCRIPTION OF A PRESENTLY PREFERRED AND VARIOUS ALTERNATIVE EMBODIMENTS OF THE INVENTION

Prior to proceeding to the much more detailed description of the present invention it should be noted that identical elements, having identical functions, have been identified with identical reference numerals throughout the several views which have been illustrated in the drawing figures for the sake of clarity and understanding of the invention.

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Now reference is made, more particularly, to Figures 1 and 2 of the drawings. Illustrated therein and is a presently preferred embodiment of a railway freight car (not shown) coupler knuckle casting, generally designated 10. Coupler knuckle casting 10 has improved bearing surface area 12.

Such coupler knuckle casting 10 having the enhanced bearing surface area 12 includes a tail section, generally designated 20, and a hub section, generally designated 30. The hub section 30 having a pivot pinhole 14 formed therein. Such pivot pinhole 14 having generally straight cylindrical sidewalls 16.

FIG. 10

A front face section 18 is connected to the hub section 20. Such front face section 18 includes a nose section 22. In certain instances, such nose section 22 will, preferably include a generally cylindrical opening 24 formed in an end portion 26 of such nose section 22. The front face section 18 further includes a pulling face portion 28 formed inwardly from such nose section 22. At least a portion of such front face portion 18 and the nose section 22 includes an enhanced bearing surface area 12 which includes a substantially flat portion 32 disposed substantially in a vertical direction and which is substantially arcuate in a horizontal direction. The substantially flat portion 32 extending for a predetermined distance in such vertical direction and for a predetermined length along the horizontal direction.

A transition section 34 joins such tail section 20 to the hub section 30. The transition section 34 includes a top metal section and a bottom metal section extending toward each other.

According to a presently preferred embodiment, the coupler knuckle casting 10 having the enhanced bearing surface area 12, the predetermined distance such substantially flat portion 32 extends in the vertical direction is generally in a range of between about 3.5 inches and about 7.0 inches. It is even more preferred, that the predetermined distance such substantially flat portion 32 extends in the vertical direction is generally in a range of between about 4.0 inches and about 5.5 inches. In the most preferred embodiment, the predetermined distance such substantially flat portion 32 extends in the vertical direction is generally in a range of between about 4.0 inches and about 4.5 inches.

Presently, it is preferred, that the coupler knuckle casting 10 be formed as a steel casting.

In the presently preferred embodiment, the coupler knuckle casting 10 having the enhanced bearing surface area 12. Such predetermined length along the horizontal direction which is substantially arcuate extends over at least a portion of said hub section 30, such front face section 18 and at least a portion of the nose section 22.

Preferably, the enhanced bearing surface area 12 is hardened to a predetermined hardness. Such predetermined hardness being at least about 40 Rockwell C.



The present invention further contemplates the combination of a railway freight car coupler (not shown) having incorporated therein the coupler knuckle casting 10 having been enhanced bearing surface area 12. It further contemplates retrofitting an existing railway freight car coupler (not shown) having incorporated therein the coupler knuckle casting 10 having the enhanced surface bearing area 12.

While in accordance with the patent statutes a presently preferred as well as various alternative embodiments of the invention have been described in detail above, it should be recognized that various other modifications and adaptations of the invention can be made by those persons who are skilled in the relevant art without departing from either the spirit of the invention or the scope of the attached claims.